INTEGRA

VACUSAFE Operating instructions

158340_V04

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INTEGRA Biosciences AG – 7205 Zizers, Switzerland

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VACUSAFE	**models: 158300, 158310, 158320, 158610, 158620**

in accordance with EC directives | gemäss der EU-Richtlinien | est conforme au terme de la directives CE | de acuerdo con las directivas CE | in conformità alle direttive CE

2006/95/EC	Low voltage equipment
2004/108/EC	Electromagnetic compatibility
2002/95/EC	Restriction of Hazardous Substances
2002/96/EC	Waste Electrical and Electronic Equipment

is in compliance with the following normative documents: | mit den folgenden normativen Dokumenten übereinstimmt: | aux documents normatifs ci-après: | cumple las documentos normativos: | soddisfa le normative seguenti:

EN 61010-1:2001-02	Safety requirements for electrical equipment for measurement, control and laboratory use - General requirements.
EN 61326-1:2006	Electrical equipment for measurement, control and laboratory use - EMC requirements.

Standards for Canada and USA

CAN/CSA-C22.2 No.1010.1-92	Safety requirements for electrical equipment for measurement, control and laboratory use - General requirements.
UL Std. No. 3101-1	Safety requirements for electrical equipment for measurement, control and laboratory use - General requirements.
FCC, Part 15, Class A	Emission

Zizers, 1.9.2009

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Imprint

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This operating instruction manual has the part number 158340, version number V04.

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1 Introduction

These operating instructions contain all information required for installation, operation and maintenance of the VACUSAFE aspiration systems.

Purpose This chapter informs about the symbols used in these operating instructions, the intended use of the VACUSAFE and the general safety instructions.

1.1 Symbols used

These operating instructions specifically advise of residual risks with the following symbols:

WARNING

This safety symbol warns against hazards that could result in injury or death. It also indicates hazards for machinery, materials and the environment. It is essential that you follow the corresponding precautions.

CAUTION

This symbol cautions against potential material damage or the loss of data in a microprocessor controller. Follow the instructions.

NOTE

This symbol identifies important notes regarding the correct operation of the device and labour-saving features.

1.2 Intended use

The VACUSAFE is a vacuum-based system for aspiration of nonexplosive aqueous solutions. It is intended for *in vitro* use only and it shall not be used for applications other than those specified.

1.3 Safety notes

The VACUSAFE corresponds to the state of the art, complies to the recognized safety regulations and is safe to operate. The VACUSAFE can be operated only when it is in perfect conditions and while observing these operating instructions.

The device may be associated with residual risks if it is used or operated improperly by untrained personnel.

Any person charged with the operation of the VACUSAFE must have read and understood these operating instructions, and particularly, the safety notes, or must have been instructed by supervisors so that safe operation of the device is guaranteed.

Regardless of the listed safety notes, additionally applicable regulations and guidelines of trade associations, health authorities, trade supervisory offices, etc. must be observed.

Do not open, convert or alter the VACUSAFE in any way. Repairs may only be performed by INTEGRA Biosciences AG or by an authorised after-sales service member.

Parts may be replaced with original INTEGRA Biosciences parts only.

Use an original INTEGRA Biosciences mains adapter only.

2 Description of the device

Purpose This chapter describes the most important components of the VACUSAFE and defines the specific terminology. Different models of the VACUSAFE are available and specifically described in these operating instructions where necessary.

NOTE

Please determine which VACUSAFE model you have purchased as it will simplify the reading of these operating instructions. Find the part number of your model on the main packaging label and note it here: 158 _____.

2.1 Scope of delivery

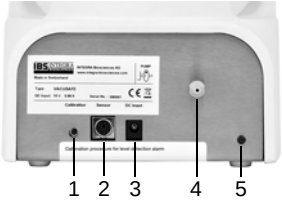
- Base
  - Bottle stand (model 158620)
    or
  - Housing with integrated bottle stand (all other models)
- Bottle
- Lid with openings for tubing
- Tubing and filter
- Cable for level sensor (models 158300, 158310 and 158610)
- Mains adapter (all models except 158620)
- VACUBOY hand operator

CAUTION

Verify the scope of delivery when unpacking the device and check for potential transportation damage. Do not operate a device that is damaged, instead contact your local dealer.

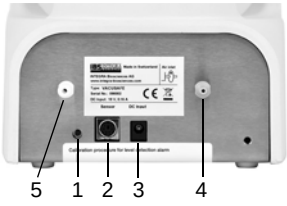
2.2 Overview of the VACUSAFE

1 Housing (bottle stand in model 158620)
2 Bottle for liquid collection
3 Lid with openings for tubing
4 Bottle handle (except model 158300)
5 VACUBOY hand operator
6 Tubing for connection of hand operator to bottle
7 Tubing for connection of base to bottle
8 On/off switch with indicator lamp
9 Knob for vacuum regulation (models 158300, 158310 and 158320)
10 Level sensor



Rear view (models 158300, 158310, 158320)

1 Button for calibration of level sensor
2 Socket for level sensor cable
3 Mains connection socket
4 Filter port (air inlet)
5 Air outlet



Rear view (model 158610)

1 Button for calibration of level sensor
2 Socket for level sensor cable
3 Mains connection socket
4 Filter port (air inlet)
5 Vacuum port for connection to external vacuum source

3 Installation

Purpose This chapter defines the operating environment and describes the installation of the VACUSAFE.

3.1 Operating environment

The VACUSAFE has been designed for use in a laboratory. It shall be installed in a level, dry and dust-free location with a temperature of 5 – 40 °C and a maximal (non-condensing) relative humidity of 80%.

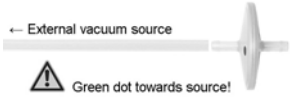
3.2 Power supply

Fit the mains adapter with the suitable plug. Insert the mains adapter cable into the VACUSAFE mains connection socket (see "Overview of the VACUSAFE" on page 8) and plug it to the power source.

WARNING
The supply voltage must meet the requirements of the mains adapter: 100 – 240 VAC, 50/60 Hz.

3.3 Set-up

3.3.1 Connection to an external vacuum source and filter protection

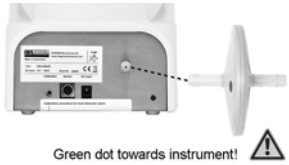


Model 158620

The external vacuum source has to be protected with the supplied hydrophobic filter. To connect the filter to the vacuum source use the tubing connector and a piece of tubing as a joint if necessary. Take care to connect the filter with the green dot turned towards the vacuum source.

Model 158610

Link your external vacuum source to the vacuum port on the back of the VACUSAFE base (use the supplied tubing connector to join tubing with different diameters if necessary). Insert the supplied hydrophobic filter into the filter port with the green dot facing the instrument. See "Rear view (model 158610)" on page 8 for the position of the vacuum and filter ports.



Models 158300, 158310 and 158320

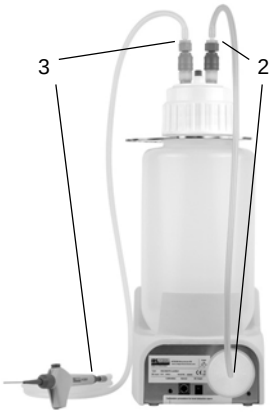
No connection to an external vacuum is required as a vacuum pump is integrated in the housing. Simply insert the hydrophobic filter into the filter port with the green dot facing the instrument (see "Rear view (models 158300, 158310, 158320)" on page 8).

WARNING

Take care to connect the filter with the green dot turned towards the instrument or vacuum source in order to guarantee that the hydrophobic side of the filter is facing the liquid collection bottle.

3.3.2 Connection of the bottle and hand operator

1) Place the bottle without lid into the bottle stand (model 158620) or in the base of the instrument (all other models). Insert the bottle handle into the neck of the bottle by screwing it in place. Close the bottle with the lid fitted with tubing openings and make sure that the lid is screwed on tightly.



2) Connect one end of the blue tubing to the filter and the other end either to the barbed fitting on the lid marked "PUMP" (models 158320 and 158620) or to the blue tubing coupling (models 158300, 158310 and 158610).
When installing model 158620, use one of the long transparent tubing instead of the short blue tubing.

3) Connect the long transparent tubing to the barbed fitting on the lid marked "HAND" (models 158320 and 158620) or to the red tubing coupling (models 158300, 158310 and 158610). Insert the VACUBOY hand operator into the other end of the long tubing.

3.3.3 Connection and calibration of the level sensor

1) Plug the level sensor cable into its socket at the back of the instrument and connect it to the bottle lid (models 158300, 158310 and 158610). Make sure that the sensor pins inside the lid are dry and unsoiled.

2) Switch on the VACUSAFE. A double beep confirms correct connection of the level sensor.

3) Press the "CALIBRATION" button on the back of the VACUSAFE base until a short beep is emitted.

In case of failed calibration (indicated by continuous beeping and blinking of the switch indicator lamp), repeat the calibration after cleaning the sensor pins inside the lid and checking that the level sensor cable is fully inserted in the lid and base.

4 Operation

Purpose This chapter describes operation and troubleshooting of the VACUSAFE.

4.1 Vacuum activation and notes on use

Model 158620

Activate the external vacuum source and wait a few seconds until the air from the collection bottle is evacuated.

Model 158610

Activate the external vacuum source and switch on the VACUSAFE to open the integrated valve (the switch indicator lamp lights). Wait a few seconds until the air from the collection bottle is evacuated. The valve will close automatically when the VACUSAFE is not in use to avoid unnecessary evaporation of volatile liquids.

Models 158300, 158310 and 158320

Switch on the VACUSAFE to start the vacuum pump (the switch indicator lamp lights). Wait a few seconds until the air from the collection bottle is evacuated. To increase or decrease aspiration speed, turn the knob for vacuum regulation to the right or left, respectively (see “Overview of the VACUSAFE” on page 8).

Aspirate liquid by pressing the green button of the VACUBOY hand operator fitted with a suitable tip. Check the level of liquid in the bottle frequently, especially when working without level sensor, and make sure that there is enough space left for the liquid that needs to be aspirated.

NOTE

To open the bottle, first release the vacuum by opening the venting port on the lid (open the sealing screw or remove the sealing cap). Alternatively you can aspirate air with the VACUBOY.
When closing the bottle for use, screw the lid on tightly. The seal in the lid needs to be adequately compressed in order to function. Also make sure the venting port is closed.

CAUTION

Prevent liquid or foam overflowing from the vacuum bottle into the filter thereby blocking it and thus limiting its safety function. In case the filter gets accidentally wetted or soiled it has to be changed immediately, otherwise

retention of liquids can not be guaranteed. Note that the hydrophobic filter holds back aqueous solutions, whereas retention of apolar liquids is limited. To prevent the build-up of foam, we recommend the use of an anti-foaming agent (e.g. Antifoam A from Sigma).

WARNING

When working with dangerous substances, you must comply with the material safety data sheet (MSDS) and the additionally applicable regulations of trade associations, health authorities, supervisory offices, etc. In addition, when working with hazardous volatile substances or biohazardous agents, either place the VACUSAFE inside a biosafety cabinet or connect the instrument's air outlet to a safety ventilation by means of a tube and of a connector (Part No. 158427).

4.2 Use of the level sensor

When the VACUSAFE bottle is full, the level sensor prevents foam or liquid from overflowing and accidentally soaking filter and instrument. As soon as foam or liquid is detected, the pump switches off (models 158300, 158310) or the valve closes (model 158610) to avoid overfilling of the bottle. Additionally, an audible alarm is activated and the switch indicator lamp starts blinking.

It is possible to deactivate the level sensor by simply disconnecting the sensor cable (confirmed by a double beep).

NOTE

Instrument, sensor cable and bottle lid constitute an assembly and they must be calibrated to match one another (see “Connection and calibration of the level sensor” on page 11*).*

If you have several lids, sensor cables and instruments and swap them, you have to recalibrate the newly formed assemblies. Depending on the degree of soiling of the sensor pins inside the lid, it may be necessary to clean them and to calibrate the level sensor periodically.

4.3 Troubleshooting

Problem	Probable cause	Remedy
Device not running.	Level sensor has been activated.	Empty the bottle.
	No electrical power.	Plug the mains adapter in the power source and in the device.
	Device is switched off.	Switch on the device (switch indicator lamp must light).
Aspiration is very low and/or pump never stops running.	Aspiration speed is set to minimum.	Turn the knob for vacuum control clockwise to increase speed.
	External vacuum source is too weak.	Increase strength of your external vacuum source.
	Leak in the vacuum system.	Close the venting port by closing the sealing screw or sealing cap. Close the bottle lid tightly. Check tubing and filter for leaks. Reduce the residual flow of the VACUBOY hand operator by closing the screw opposite the operator button (see the VACUBOY operating instructions).
	Liquid overflowed thereby blocking filter.	Empty the bottle and exchange the filter
	Tubing is blocked.	Clean or exchange the tubing.
Level sensor activated erroneously (bottle is not full).	Sensor cable is connected incorrectly.	Fully insert the sensor cable with the correct orientation in the lid and base sockets.
	Foam activates the level sensor.	Use an anti-foaming agent (e.g. Antifoam A from Sigma)
	No or incorrect calibration.	Calibrate following the instructions (see “Connection and calibration of the level sensor” on page 11).
	Soiled sensor pins.	Clean pins inside the lid and recalibrate.
	Electromagnetic interferences disturb level sensor.	Eliminate or inactivate the source of electromagnetic interference.

5 Maintenance

5.1 Cleaning and servicing

WARNING

Always switch off the VACUSAFE and disconnect it from the mains when carrying out maintenance work.

If the VACUSAFE gets soiled, it can be cleaned with a cloth moistened with soapy water or with a 70% ethanol solution.

It is recommended to change the hydrophobic filter regularly, at least once a year. Should the filter get wetted or soiled accidentally, it has to be changed immediately.

Regular servicing of the VACUSAFE by a qualified representative of INTEGRA Biosciences AG is recommended.

5.2 Autoclaving and chemical sterilisation

To inactivate potential biohazards that contaminate the aspirated liquid and consequently also some parts of the VACUSAFE, read the information described below.

See also the warnings in “Vacuum activation and notes on use” on page 12.

5.2.1 Autoclaving

It is recommended to autoclave the full polypropylene bottle for at least 60 min. and the full glass bottle for at least 20 min. at 121°C. To determine the sterilisation time precisely, measure the temperature in the autoclave using as reference an identical filled bottle and by following the autoclave manufacturer’s instructions.

CAUTION

The lid with black tubing couplings made of POM (delivered with model 158610) is not autoclavable. It is not recommended to autoclave the VACUBOY regularly, however, it can be autoclaved sporadically for decontamination. Do not re-use an autoclaved filter.

CAUTION

The bottle lid has to be always unscrewed and kept loosely on the bottle during autoclaving. The tubing couplings made of PVDF (delivered with

models 158300 and 158310) have to be always disconnected during autoclaving.

5.2.2 Chemical sterilisation

Two methods for chemical inactivation of biohazardous agents are commonly used. A suitable disinfectant is either added to the full collection bottle and left to react for the recommended time or the disinfectant is added to the empty bottle so that the aspirated liquid gets sterilised as it accumulates in the bottle.

When using the first method, any disinfectant can be used, provided that it is compatible with the bottle material (glass or polypropylene).

CAUTION

When using the second method of chemical sterilisation, use disinfectants that are free of chlorine or other corrosive agents, especially when corrosive vapours are generated and aspirated. A suitable disinfectant is for example TriGene manufactured by Medichem International.

5.3 Equipment disposal

The VACUSAFE is labelled with the “crossed-out wheeled bin” symbol to indicate that this device must not be disposed of with unsorted municipal waste. Instead, it is your responsibility to correctly dispose of your waste equipment by handing it over to an authorised facility for separate collection and recycling. It is also your responsibility to decontaminate the device in case of biological, chemical, and/or radiological contamination so as to protect from health hazards the persons involved in the disposal and recycling of equipment.

For more information about where you can drop off your waste equipment for recycling, please contact your local dealer from whom you originally purchased the product or your local council.

By doing so, you will help conserve natural resources and you will ensure that your waste equipment is recycled in a manner that protects human health and the environment. Thank you!

6 Technical data

6.1 Specifications

Vacuum range	–300 to –600 mbar, continuously adjustable (models 158300, 158310, 158320) –600 mbar, fix (model 158610)
Flow rate	Pump: 8 L/min (air); Aspiration: 15 ml/s (liquid) (models 158300, 158310, 158320)
Dimensions (H x W x D)	420 x 210 x 210 mm (model 158620) 530 x 180 x 320 mm (all other models)
Weight	2.0 kg (model 158620) 2.7 kg (model 158610) 3.4 kg (models 158300, 158310, 158320)
Electrical data	Mains adapter input: 100–240 VAC, 50/60 Hz Mains adapter output: 18 VDC, 0.84 A Device: 18 VDC, 0.16 A (model 158610) 18 VDC, 0.66 A (models 158300, 158310, 158320)
Degree of protection	IP21
Ambient conditions	Operation: 5 to 40 °C, max. 80% RH (non-condensing) Storage: –10 to 40 °C, max. 95% RH (non-condensing)

6.2 Chemical compatibility

The table below lists VACUSAFE parts that come into contact with the aspirated liquid or its aerosols and vapours, and rates the compatibility of these parts to a few of the chemicals commonly used in laboratories. To determine the compatibility of a component to a chemical not listed in the table, please consult one of the several tables available on the internet.

Note that the rating refers to soaking in the concentrated chemical; however, more relevant here is the attenuated effect resulting from indirect contact with the diluted chemical. It is recommended to test the compatibility of relevant components to a specific chemical prior to extensive use.

INTEGRA Biosciences AG does not warrant that the information in the table is accurate or complete and that any material is suitable for any purpose.

Chemical compatibility chart

Parts		Materials	Bleach (e.g. NaClO)	Ethanol	Hydrochloric acid	Sodium hydroxide	Acetone	DMSO	Trichlorethylene	Chloroform	Phenol
VACUBOY	Plastic parts	POM	P	G	F	G	G	G	P	F	F
	O-rings	FPM (Viton)	G	G	G	P	P	F	G	G	G
	Valve spring	Stainless steel	F	G	P	F	G	G	G	G	G
Tubing		Silicone	G	G	P	P	P	G	F	P	P
Bottle + Lid	Bottle/Lid	Polypropylene	G	G	G	G	G	G	F	F	G
	Tubing couplings	PVDF	G	G	G	P	P	P	G	G	G
		POM	P	G	F	G	G	G	P	F	F
Filter	Membrane	PTFE	G	G	G	G	G	G	F	F	G
	Housing	Polypropylene	G	G	G	G	G	G	F	F	G
VACUSAFE base	Pump housing	PPS	G	F	G	G	G	G	G	G	G
	Pump membrane	FPM (Viton)	G	G	G	P	P	F	G	G	G
	Valve housing	PPS	G	F	G	G	G	G	G	G	G
	Valve membrane	PTFE	G	G	G	G	G	G	F	F	G

Compatibility ratings:

G = Good: no or minor effects (discolouration or slight corrosion).
F = Fair: moderate effects (softening, swelling and loss of strength), not recommended for continuous use.
P = Poor: not recommended.

7 Accessories and consumables

Accessories		Part No.
Bottle	4 litres, polypropylene	158370
	3 litres, glass	158420
Lid for 4L bottle	with quick couplings (PVDF) + level detection	158401
	with quick couplings (POM) + level detection	158402
	with barbed tubing fittings	158372
Lid for 3L bottle	with quick couplings (PVDF) + level detection	158418
4L bottle and lid	comprises part no. 158 370 and 158 401	158431
	comprises part no. 158 370 and 158 402	158433
	comprises part no. 158 370 and 158 372	158432
3L bottle and lid	comprises part no. 158 420 and 158 418	158430
Level sensor cable		158403
Bottle handle	for carrying polypropylene bottle (see “Overview of the VACUSAFE” on page 8)	158625
Bottle stand 	for 4L polypropylene bottle	158630
Stand 	for PIPETBOY (*acu* or *comfort*) and VACUBOY	158065
Mains adapter	100-240 VAC, 50/60 Hz	158395
Y-connector	for connection of second VACUBOY hand operator	158354
Air outlet connector	for connection of tubing to the air outlet of the pump	158427
VACUBOY	hand operator	155510
VACUBOY set	(see VACUBOY operating instructions)	155500

Consumables		**Part No.**
Tubing	for connection of hand operator to bottle, 1.8 m, silicone	158332
	for connection of base to bottle, 0.7 m, silicone, blue	158331
Filter	for protection of vacuum source, 0.45 µm, hydrophobic	158015
Tubing set + filter	comprises part no. 158 331, 158 332, 158 015	158342

Quick tubing couplings		**Material**	**Part No.**
Coupling plug (linked to tubing)	self-closing, with barbed fitting, white/blue	PVDF	158416
	self-closing, with barbed fitting, white/red	PVDF	158417
	open, with barbed fitting, black	POM	158437
Coupling socket (mounted on lid)	self-closing, with O-ring, white/blue	PVDF	158423
	self-closing, with O-ring, white/red	PVDF	158424
	self-closing, with O-ring, black/blue	POM	158435
	self-closing, with O-ring, black/red	POM	158436